A MEMORIAL REPORT ON THE TOM CRAWFORD COLLECTION OF VICTORIAN OPISTHOBRANCHIA

By

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Plate 4, Text Figures 1-50.

SUMMARY

Thirty-nine species of opisthobranchiate Gastropoda from the central Victorian coastline comprise the collection of the late Tom Crawford (1944-1966). Six new species are described: *Aglaja henri Discodoris crawfordi, D. turia, D. paroa, Sclerodoris tarka* and *Acanthodoris nanega.* Zoogeographically, 71% of the remaining species form part of the large cool-temperate eurythermal fauna that extends from southern Queensland — northern New South Wales around southern Australia to south Western Australia, and 29% have circumglobal and Indo-Pacific relationships.

INTRODUCTION

Plate 4
Tom Crawford, 1966

Thomas William Crawford, only child of Margaret and Les Crawford of North Balwyn, Victoria, died in October 1966 at the early age of 22 years. In his crowded life from adolescence through youth to young manhood, his greatest interests lay in the natural sciences. At various times, he engaged in the fields of horticulture, botany, entomology, marine biology and malacology. From the time that he became a member of the Malacological Society of Australia in 1958 until shortly before his death, Tom collected extensively along the Victorian coastline and had amassed a large collection of molluscs, especially the smaller marine and terrestrial species. He was very interested in the 'Flinders Project', a detailed cumulative list and ecological survey of the molluscan fauna of the extensive reefs of Flinders, organized by the Victorian Branch of the Malacological Society of Australia, and left manuscript notes of his research. He published one short article on the small molluscs associated with *Zostera* and *Posidonia* (Crawford, 1965). He dredged in depths up to 15 fathoms in Port Phillip Bay, Western Port and the inshore waters of Bass Strait, both by himself and in company. Many new records for the Victorian molluscan fauna are in his collection.

Obituary notices have appeared in the publications of the various societies of which he held membership: Royal Society of Victoria, *Proceedings* 80 (2): 345 (1967); Malacological Society of Australia, *Australian Newsletter* 15: 5 (1967); Marine Study Group of Victoria, *Marine News* 31: 1 (1967); and Australian Rhododendron Society, *The Rhododendron* 6 (1): 15 (1967). Tom Crawford was also a member of the Entomological Society of Victoria, and at an earlier age was an active member of the Junior Field Naturalists.

In December 1965, Tom Crawford gave the opisthobranchs of his collection, in all 39 species, together with field data and a few colour transparencies, to the writer for research purposes. The collection proved to be very valuable as it contained six new species. Consequently, the bulk of the collection has been retained as a whole and is here reported upon as a personal memorial to a brilliant collector and knowledgeable friend.

The writer acknowledges with sincere thanks the kindness of Mr. and Mrs. L. Crawford in loaning the photograph reproduced here. This research was carried out while the writer was in receipt of a grant from the Science and Industry Endowment Fund, C.S.I.R.O., Melbourne. The collection together with other material considered in this paper has been presented to the National Museum of Victoria, Melbourne. Unless otherwise stated, all material was collected by Tom Crawford; numbers preceded by the letter 'F' denote the registration number of the material in the National Museum of Victoria.

LIST OF SPECIES

Subclass *EUTHYNEURA*

Superorder OPISTHOBRANCHIA

Order *CEPHALASPIDEA*

Superfamily Bullacea
    Family Atyidae
        1. *Haminoea maugeansis* Burn, 1966. Fig. 1.
        2. *Liloa brevis* (Quoy and Gaimard, 1832). Figs. 2-7.
    Family Diaphanidae
        3. *Diaphana tasmanica* (Beddome, 1883).

Superfamily Philinacea
    Family Aglajidae
        4. *Aglaja henri* sp. nov. Figs. 8-9.
    Family Gastropteridae
        5. *Gastropteron* sp.
    Family Philinidae
        6. *Philine columnaria* Hedley and May, 1908. Figs. 10-16.

Superfamily Runcinacea
    Family Runcinidae
        7. *Ilbia ilbi* Burn, 1963.

Order *ANASPIDEA*
    Family Aplysiidae
        8. *Aplysia (Pruvotaplysia) parvula* Morch, 1863.
        9. *Aplysia (Varria) sowerbyi* Pilsbry, 1895.
        10. *Aplysia (Aplysia) juliana* Quoy and Gaimard, 1832.

Order *ASCOGLOSSA*

Superfamily Juliacea
    Family Bertheliniidae
        11. *Tamanovalva babai* Burn, 1965.
        12. *Edenttellina typica* Gatliff and Gabriel, 1911.

Superfamily Oxynoacea
    Family Oxynoidae
        13. *Oxynoe viridis* (Pease, 1861).
        14. *Lophopleurella wilsoni* (Tate, 1889).

Order *NOTASPIDEA*

Superfamily Pleurobranchacea
    Family Pleurobranchidae
        15. *Berthella mediata* Burn, 1962.
        16. *Pleurobranchaea maculata* (Quoy and Gaimard, 1832).

Order *DORIDACEA*

Suborder EUDORIDACEA

Tribe Cryptobranchia
    Family Dorididae
    Subfamily Chromodoridinae

17. *Chromodoris alternata* (Burn, 1957).
18. *Chromodoris perplexa* (Burn, 1957). Fig. 17
19. *Chromodoris* sp.

Subfamily Miamirinae

20. *Ceratosoma brevicaudatum* Abraham, 1876.

Subfamily Aldisinae

21. *Rostanga arbuta* (Angas, 1864).
22. *Rostanga hartleyi* Burn, 1958.

Subfamily Discodoridinae

23. *Discodoris dubia* Bergh, 1904. Fig. 18.
24. *Discodoris crawfordi* sp. nov. Figs. 19-24.
25. *Discodoris turia* sp. nov. Figs. 25-29.
26. *Discodoris paroa* sp. nov. Figs. 30-34.

Subfamily Halgerdinae

27. *Aphelodoris rossquicki* Burn, 1966.
28. *Sclerodoris tarka* sp. nov. Figs. 35-40.

Subfamily Platydoridinae

29. *Hoplodoris nodulosa* (Angas, 1864).

Tribe Phanerobranchia

Superfamily Nonsuctoria
Family Polyceridae

30. *Kaloplocamus ramosus* (Cantraine, 1835).

Superfamily Suctoria
Family Onchidorididae

31. *Acanthodoris nanega* sp. nov. Figs. 41-43.

Suborder POROSTOMATA
Family Dendrodorididae

32. *Dendrodoris nigra* (Stimpson, 1855).
33. *Doriopsilla staminea* (Basedow and Hedley, 1905). Figs. 44-45.
34. *Doriopsilla carneola* (Angas, 1864).

Order *DENDRONOTACEA*
Family Scyllaeidae

35. *Scyllaea pelagica* Linne, 1758.

Order *ARMINACEA*
Suborder PACHYGNATHA
Family Madrellidae

36. *Madrella sanguinea* (Angas, 1864).

Family Antiopellidae
37. *Caldukia affinis* (Burn, 1958).

Order *EOLIDACEA*

Suborder PLEUROPROCTA
Family Coryphellidae
38. *Coryphella poenicia* (Burn, 1957).

Suborder CLEIOPROCTA
Family Aeolidiidae
39. *Spurilla macleayi* (Angas, 1864). Figs. 46-50.

SYSTEMATIC SECTION

1. *Haminoea maugeansis* Burn, 1966

Figure 1.

Haminoea maugeansis Burn, 1966d: 330.

Material: Off Newhaven, Westernport, 6 fathoms on mud and *Zostera*, 11 May, 1963, 29 specimens, F26901.

Description: These specimens vary in dimensions from 4.4 by 3.1 mm. to 3.3 by 2.4 mm., therefore are slightly broader (74.5% - 72.7%) than the larger 7 by 5 mm. (71.4%) shells of the type series from Port MacDonnell, South Australia (Burn, 1966d: 330). Dark grey pigment cells remain along the mantle margin in preserved specimens and paler grey cells are present on the head shield and foot. As in other species, the inner dissolved whorls of the shell are marked only by a cord of tightly folded conchiolin. The original description omitted to mention that the Hancock's organs (Fig. 1) are both short and lowly ribbed. The radula has the formula 21 x 6.1.6, lateral teeth as originally described, the rhachidian differing by its smaller size and reduced cusp without lateral denticles. The ribs of the gastral plates are quite pointed in the middle line.

Remarks: H. maugeansis is close to the genus *Lamprohaminoea* Habe (1952: 150), the type of which *L. cymbalum* (Quoy and Gaimard, 1832) has recently been characterized (Marcus and Burch, 1965: 243). At present, the short ribbed Hancock's organs of the former prevent its assignment to *Lamprohaminoea* where these organs are long ridges.

2. *Liloa brevis* (Quoy and Gaimard, 1832)

Figures 2-7.

Bulla brevis Quoy and Gaimard, 1832: 358, pl. 26, fig. 36-37.

Haminoea brevis. Angas, 1867: 227; Pilsbry, 1894: 373, pl. 40, fig. 96, 9-10; Pritchard and Gatliff, 1903: 216; May, 1921: 104; 1923: pl. 46, fig. 16; Cotton and Godfrey, 1933: 85, pl. 1, fig. 14;

Macpherson and Gabriel, 1962: 242, fig. 282; Hodgkin et al., 1966: 53, pl. 21, fig. 6; Burn, 1966c: 266.

Haminoea cuticulifera Smith, 1872: 350; 1884: 87, pl. 6, fig. H; Angas, 1877: 189; Pilsbry, 1894: 372, pl. 41, fig. 13; Pritchard and Gatliff, 1903: 217; Cotton and Godfrey, 1933: 86.

Cylichna cuticulifera. Watson, 1886: 663.

Liloa brevis. Iredale and McMichael, 1962: 88.

Liloa cuticulifera. Allan, 1940: 178, figured; Iredale and McMichael, 1962: 88.

Haminoea (Liloa) cuticulifera. Allan, 1950: 200, fig. 45 (8).

Material: Off Newhaven, Westernport, 6 fathoms on mud and *Zostera*, 11 May, 1963, 50 specimens, F26902.

Off Safety Beach, Dromana, Port Phillip, 5 fathoms on muddy sand, 5 March, 1963, 2 specimens, F26903.

Off Rye pier, Port Phillip, 3 fathoms on *Zostera* beds, 5 March, 1963, 9 specimens, F26904.

Description: The shells (Fig. 2-3) measure from 12.8 by 6.4 mm., breadth 50%, to 2.9 by 1.8 mm., breadth 62.1%. They are thin, hyaline, with parallel sides as in Smith's figure (Pilsbry, 1894: pl. 41, fig. 13) and nearly square posterior end. The largest specimen has 19 stronger anterior and 10 weaker posterior thread-like striae, while 3 mm. long specimens have from 5 to 15 anterior and 3 to 6 posterior striae; some small specimens have 3 or 4 additional striae between the anterior and posterior lots. Port Phillip shells all have an orange periostracum, which is thicker at each end and along the inner side of the aperture.

The animal (Fig. 4) is creamy-yellow with small purple-brown spots ringed with aggregated white pigment cells in the mantle. The Hancock's organs are chrome yellow in life. The extended animal is twice the shell length. The head shield is small and bilobed behind; small black eyes show dorsally. A pair of triangulate parapodia covers the long neck, the ridge-like Hancock's organs (Fig. 5) and the anterior shell; their posterior end is level with the truncate tail of the foot.

The jaws are small, colourless or pale yellowish, crescentic in shape and made up of fine elements. The small radula has 17 x 22.1.22 teeth. The rhachidian (Fig. 6) is broad with a long cusp and a stout shorter denticle each side. The simple lateral teeth have a long cusp and broad base. The dark brown gastral plates have 17 arched ribs upon the edge of which stand short stout bristles of irregular height.

The male copulatory organ (Fig. 7) extends to the left over the alimentary tract, then curves to the right so that the prostate gland lies just below the skin on the right-hand side of the neck just within the shell. In an 8 mm. long shell, the male organ measured 3 mm. in length; that from a 16 mm. long shell from Sydney Harbour measured 9 mm. in length, of which the prostate gland was 3.5 mm. long by 2 mm. wide. The penial papilla (p) is a long free appendage with dilated spherical head and narrower stem attached to the wall of the atrium at about the inner third. The penial stem is armed with numerous very small annular ribs from which minute spines project. The penial head is quite smooth except for a large conical hole in the outer face; this opens into a spherical flask-like sac, possibly for holding sperm, about one-third the diameter of the head, with muscular walls and spongy contents. A shallow depression in the annular ribs apparently conveys sperm along the stem to the penial head, if not to the sperical sac. The fundus of the atrium is blocked by a large spherical valve, within which project about 12 evenly spaced rather wide and high longitudinal plicae. The low ciliated rib extension of the seminal duct does not attain the outer opening of this valve. From the inner opening of the valve, the lumen passes each way into a pair of connected seminal vesicles. The upper pyriform vesicle (sv) is soft and flattened, its walls lined with about 20 concentric lamelliform plicae all centred upon the opening of the prostate gland. The longer lower banana-shaped vesicle is muscular and rounded in section; a single high rib projects into the lumen on the curved outer side. This rib continues to and rims the opening of the prostate gland in the upper vesicle. The ovoid prostate gland (pr) comprises small orange cells arranged in radials at the duct, and large yellow cells in four and five sided blocks away from it.

Remarks: As presently conceived, *Liloa brevis* is a variable species. Topotypical animals with shells matching the original description and figures need to be examined in order to justify the synonymy assembled above. The present material belongs to *L. brevis* as understood by past authors (Pritchard and Gatliff, 1903; May, 1921, 1923; Cotton and Godfrey, 1933), yet both conchologically and anatomically, it is identifiable with examined specimens of *L. cuticulifera* (Smith, 1872) from Sydney Harbour, New South Wales. Under these circumstances, the latter must become a synonym of the earlier *L. brevis.* On the other hand, local shells and a figured specimen from Western Australia (Hodgkin et al., 1966; pl. 21, fig. 6) differ from the type figures in the nearly square posterior end and the more oblong shape, but until it can be shown that these are valid differences justifying separation, it is preferable to identify the specimens with *L. brevis.*

The anatomy of *Liloa* appears not to have been described in the literature. Besides the cylindrical form of the shell and the presence of spiral striae, the present species at least is characterized by (i) animal twice length of shell, (ii) neck and anterior shell protected by strong, short parapodia, (iii) small crescentic jaws, (iv) non-denticulate *Haminoea*-like radula, formula 17 x

22.1.22, (v) gastral plates with short bristles along the ribs, and (vi) male copulatory organ with armed penis, ovoid prostate and paired seminal vesicles.

3. *Diaphana tasmanica* (Beddome, 1883)

Akera tasmanica Beddome, 1883: 169; Pilsbry, 1895: 379; Tate and May, 1901: 417, 460; Gatliff and Gabriel, 1908: 385, pl. 21, figs. 7-7b; May, 1921: 104; 1923: pl. 46, fig. 15; Cotton and Godfrey, 1933: 83; Crawford, 1965: 13.

Material: Ocean Beach, Flinders, on *Posidonia*, April-May, 1965, 6 plus specimens.

Remarks: This 2 mm. long species is common on *Posidonia* at the above locality where it may be collected by sweeping a fine sieve through the weed. The animal is not at all like *Akera*, being without parapodia and completely retractile within the shell. The body whorl is not separated by a sinus as suggested by Gatliff and Gabriel's figures, but is correctly described as "separated by a channelled suture" (Tate and May, 1901: 460). The shell, absence of parapodia and a brief observation of the radula (formula 1.1.1, teeth agreeing in shape with Odhner's figures, 1926: figs. 2-3) are sufficient to warrant the transfer of this species to *Diaphana*.

4. *Aglaja henri* sp. nov.

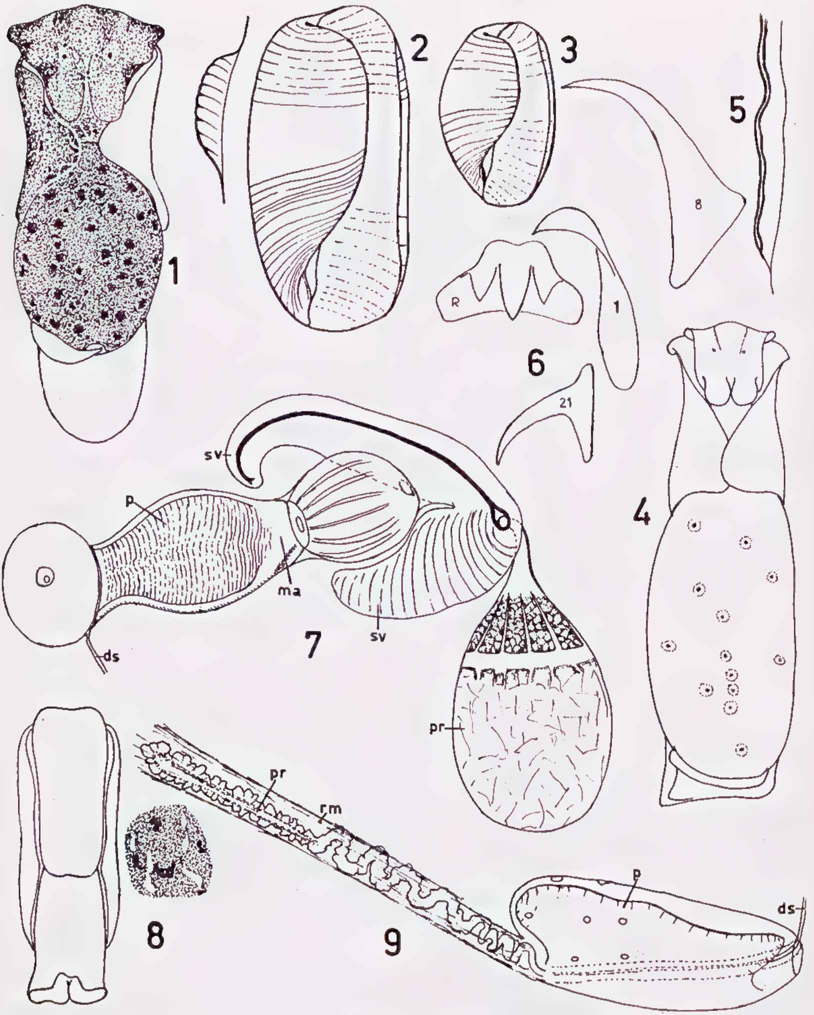
Figures 8-9.

Material: Point Henry, Corio Bay, Port Phillip, crawling among *Zostera* and *Caulerpa*, 24 April, 1966, 1 specimen (Holotype), Miss Margery Murray, F26905.

Yanakie Beach, Corner Inlet, crawling among *Zostera* at low tide, 23 April, 1965, 1 specimen, F26906.

Description: Alive, the Holotype (Fig. 8) was 28 mm. long and 10 mm. broad; preserved length is 22 mm. Animal dark brown, in detail composed of paler brown ground-colour, widely spaced very dark brown spots and flecks and translucent areas and patches, the latter filled with white spherical pigment cells. The latter predominate along the parapodial margins and rear of the head shield. The sole has only a few small dark brown spots.

The head shield is a little longer than the mantle shield, truncate at each end. The mantle shield has a pair of short posterior lobes of equal length. Short colourless setae were observed in life projecting from either side of the mouth. Fourteen deeply plicate dorsal plumes are present on the broad gill. The shell, approximately 4 mm. broad and 3 mm. long, is covered by a loose dark brown periostracum; a long tapering pillar-like columella projects on the inner side. The pharynx is large and very muscular. The male copulatory organ (Fig. 9) is of Marcus' type B, with a long simple coiled prostate (pr) coursing within the penial retractor muscle (rm) and the penial papilla (p) attached along one side



FIGURES 1-9. *Haminoea maugensis* Burn: 1, dorsal view of live animal and detail of Hancock's organ. *Liloa brevis* (Quoy and Gaimard): 2, largest Victorian shell; 3, smallest Victorian shell; 4, dorsal view of live animal; 5, Hancock's organ; 6, radular teeth; 7, male copulatory organ. *Aglaja henri* sp. no.: 8, dorsal view of live Holotype and detail of colour pattern; 9, male copulatory organ.

Key to lettering. a — ampulla, b — spermatheca, c — oral cavity, d — vas deferens, male or efferent duct, ds — seminal groove, g — vestibular gland, h — stylet, lp — labial palpes, ma — male atrium, penial sheath, n — nebensack, o — oral tentacles, oe — oesophagus, p — penis, pr — prostate gland, py — pharynx, rm — retractor muscle, s — spermatocyst, sv — seminal vesicle, v — vagina.